Anatomic boundaries of the clinical target volume (prostate bed) after radical prostatectomy.


Abstract

PURPOSE: We sought to derive and validate an interdisciplinary consensus definition for the anatomic boundaries of the postoperative clinical target volume (CTV, prostate bed).

METHODS AND MATERIALS: Thirty one patients who had planned for radiotherapy after radical prostatectomy were enrolled and underwent computed tomography and magnetic resonance imaging (MRI) simulation prior to radiotherapy. Through an iterative process of consultation and discussion, an interdisciplinary consensus definition was derived based on a review of published data, patterns of local failure, surgical practice, and radiologic anatomy. In validation, we analyzed the distribution of surgical clips in reference to the consensus CTV and measured spatial uncertainties in delineating the CTV and vesicourethral anastomosis. Clinical radiotherapy plans were retrospectively evaluated against the consensus CTV (prostate bed).

RESULTS: Anatomic boundaries of the consensus CTV (prostate bed) are described. Surgical clips (n = 339) were well distributed throughout the CTV. The vesicourethral anastomosis was accurately localized using central sagittal computed tomography reconstruction, with a mean +/- standard deviation uncertainty of 1.8 +/- 2.5 mm. Delineation uncertainties were small for both MRI and computed tomography (mean reproducibility, 0-3.8 mm; standard deviation, 1.0-2.3); they were most pronounced in the anteroposterior and superoinferior dimensions and at the superior/posterior-most aspect of the CTV. Retrospectively, the mean +/- standard deviation CTV (prostate bed) percentage of volume receiving 100% of prescribed dose was only 77% +/- 26%.

CONCLUSIONS: We propose anatomic boundaries for the CTV (prostate bed) and present evidence supporting its validity. In the absence of gross recurrence, the role of MRI in delineating the CTV remains to be confirmed. The CTV is larger than historically practiced at our institution and should be encompassed by a microscopic tumoricidal dose.

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